POWTRAN®

PB200 Series

Brake unit Operating manual

POWTRAN

Brake Unit

www.powtran.com

Thank you for choosing POWTRAN design and produce brake unit. This product made by POWTRAN is based on years of experience in professional production and sale, and designed for feed back the regenerative consumption of motor to the brake resistor when the motor decelerates, enhances the brake capability of the inverter, ensures the motor to stop in a short time in the setting time.

For any problem when using this product, please contact your local dealer authorized by this company or directly contact this company, our professionals are happy to serve you.

The end-users should hold this manual, and keep it well for future maintenance & care, and other application occasions. For any problem within the warranty period, please fill out the warranty card and fax it to the our authorized dealer.

The contents of this manual are subject to change without prior notice. To obtain the latest information, please visit our website.

For more product information, please visit: http://www.powtran.com.

Powtran

December,2018

Contents

POWTRAN brake unit have been tested and inspected before leaving factory. After purchasing, please check if its package is damaged due to careless transportation, and if the specifications and model of the product are consistent with your order requirements. For any problem, please contact your local authorized POWTRAN dealer or directly contact this company.

1-1. Inspection after unpacking

※ Check if that packing container contains this unit, one manual and one warranty card.

※ Check the nameplate on the side of the frequency inverter to ensure that the product you have received is right the one you ordered.

1-1-1. Instructions on nameplate

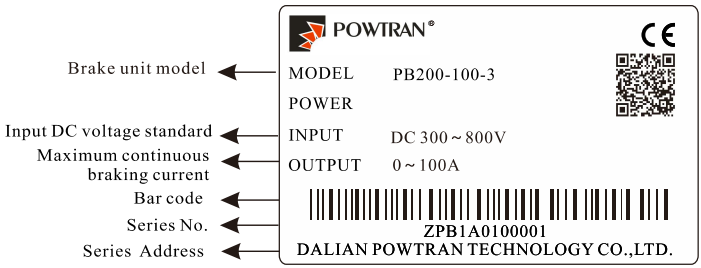


Figure 1-1:Nameplate description

1-1-2. Model instruction

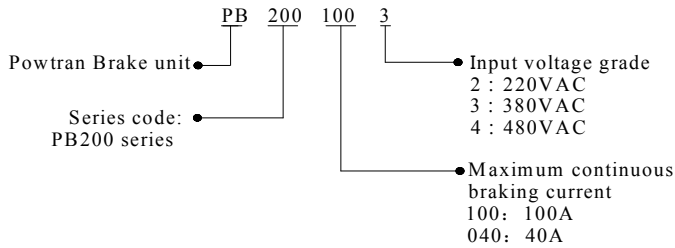


Figure 1-2:Model description

1-2. .Safety precautions

Safety precautions in this manual are divided into the following two categories:

Danger: the dangers caused by failure to perform required operation, may result in serious injury or even death;

Caution:the dangers caused by failure to perform required operation, may result in moderate injury or minor injury, and equipment damage;

Process	Type
Dangerous	● Only well-trained personnel are allowed to use this unit. ● Fix the screw when connecting, or the loose connection will lead fire or creepage. ● Grounding terminal should be reliable grounding braking unit, or get an electric shock risk. ●Do not touch the brake unit, the internal spares and printing board after the brake unit is connected, otherwise it will lead to electric shock. There is high voltage direct current inside. ●Don't let the cable damage from weight hanging and over load, or get an electric shock risk. ●The unit and brake resistor should be installed on the medium with flame retardancy (such as metal), away from combustible material, otherwise may cause fire ●Please check the wiring is correct before operation. Please confirm whether the input DC voltage and brake unit voltage same level; Whether Input terminal (+, -) and resistance terminal (RB1, RB2) connection position is correct; And check the peripheral circuit of the connected to the drive for short circuit phenomenon, whethe the line is fastening, otherwise cause damage of drive. ●Please check whether master-slave choice and voltage grade Settings are correct. ●During the running, do not touch any spares inside. ●The repairs and maintenance task can be performed only when the inverter bus voltage is lower than DC 36V, Power off more than ten minutes.Otherwise, the residual charge from capacitor would cause personal injury!
Attention	● Do not use any brake unit and brake resistor lack of or with damaged spares. ●Do not touch the internal spares for there are CMOS spares on the control card of the brake unit. Otherwise it will damage the spares. ●When many pieces brake units installed in parallel when used in the same case, pleas install the fan or other cooling device. ●Ensure the right setting of brake unit and brake resistor. ●Do not make voltage resistance test on the brake unit, or it will lead semiconductor spares damaged in the main circuit of the brake unit. ●Braking resistor should be temperature protection and other protection, if the brake resistance keep hot which caused by the failure of the brake unit. fever, necessary to isolate itself, does not automatically isolation caused any accident not be burdened by Powtran. ●Please refer to the content in the manual when analyze and manage the fault of the brake unit. Any modification to the brake unit is not allowed otherwise the life harm and property loses will not be burdened by Powtran. ●This product is the accessories of the inverter, if it is used improperly which would not only do damage to itself but also to the inverter. Please pay much attention to this. ●Only the well-trained personnel are allowed to use this unit, and such personnel must read through the parts of this manual relating to the safety, installation, operation and maintenance before using the unit. The safe operation of this unit depends on correct transport, installation, operation and maintenance.

Note: When brake unit work with powtran inverter,powtran will responsible for quality, If the brake unit work for other project, Please make your own insurance related domestic property insurance, in order to get better compensation from insurance company.

2-1.Technical specifications

Brake unit model	Starting brake voltage (V)	Maximum continuous braking current (A)
PB200-040-2	350	40
PB200-050-2	350	50
PB200-075-2	350	75
PB200-100-2	350	100
PB200-180-2	350	180
PB200-250-2	350	250
PB200-040-3	670	40
PB200-050-3	670	50
PB200-075-3	670	75
PB200-100-3	670	100
PB200-180-3	670	180
PB200-250-3	670	250
PB200-040-4	760	40
PB200-050-4	760	50
PB200-075-4	760	75
PB200-100-4	760	100
PB200-180-4	760	180
PB200-250-4	760	250

2-2.Main circuit terminal screw specifications

Brake unit model	Main circuit screw specification	Tightening torque (Nm)
PB200-040-2	M5	2~2.5
PB200-050-2	M5	2~2.5
PB200-075-2	M5	2~2.5
PB200-100-2	M5	2~2.5
PB200-180-2	M8	9~11
PB200-250-2	M8	9~11
PB200-040-3	M5	2~2.5
PB200-050-3	M5	2~2.5
PB200-075-3	M5	2~2.5
PB200-100-3	M5	2~2.5
PB200-180-3	M8	9~11
PB200-250-3	M8	9~11
PB200-040-4	M5	2~2.5

PB200-050-4	M5	2~2.5
PB200-075-4	M5	2~2.5
PB200-100-4	M5	2~2.5
PB200-180-4	M8	9~11
PB200-250-4	M8	9~11

2-3.Installation

2-3-1 Working environment

The breaking unit shall be installed in the room where it is well ventilated, the wall mounted installation shall be adopted.

2-3-2Installation environment

1. Ambient temperature -10 ° C ~ 50 ° C. If exceeding 40 °C, derating at a rate of 3% derating for every 1 °C. It is not recommended to use in an environment above 50 °C.
2. Prevent electromagnetic interference and keep away from interference sources.
3. Prevent the intrusion of dust, cotton wool and fine metal powder.
4. Prevent the intrusion of oil, salt and corrosive gases.
5. Avoid vibration.
6. Avoid high temperature and humidity and no rain dripping, humidity less than 90% RH (No condensation).
7. It is forbidden to use under hazardous environmental conditions such as flammability, flammability, explosive gas, liquid or solid.
8. The braking resistor cannot be installed close to the air inlet of the brake unit.

2-4.Dimension and installation dimension

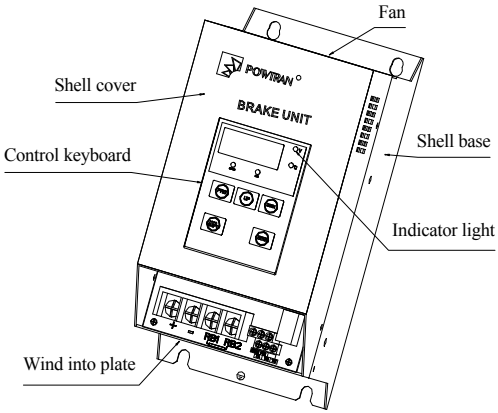


Figure 2-1:40-100A the braking unit sketch

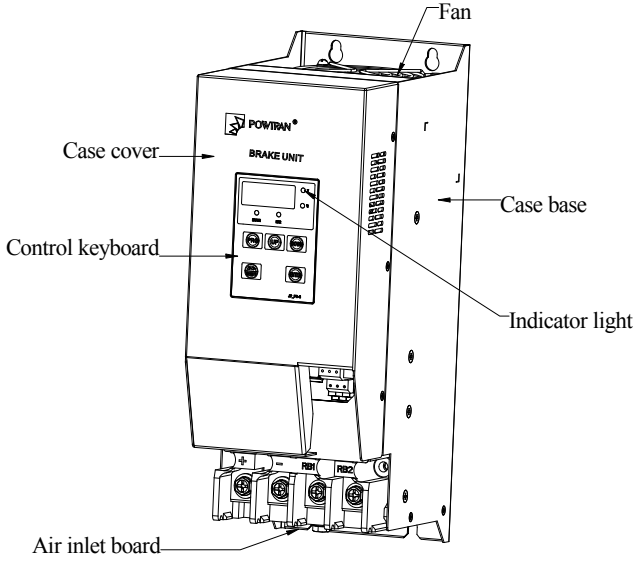


Figure 2-2:180-250A the braking unit sketch

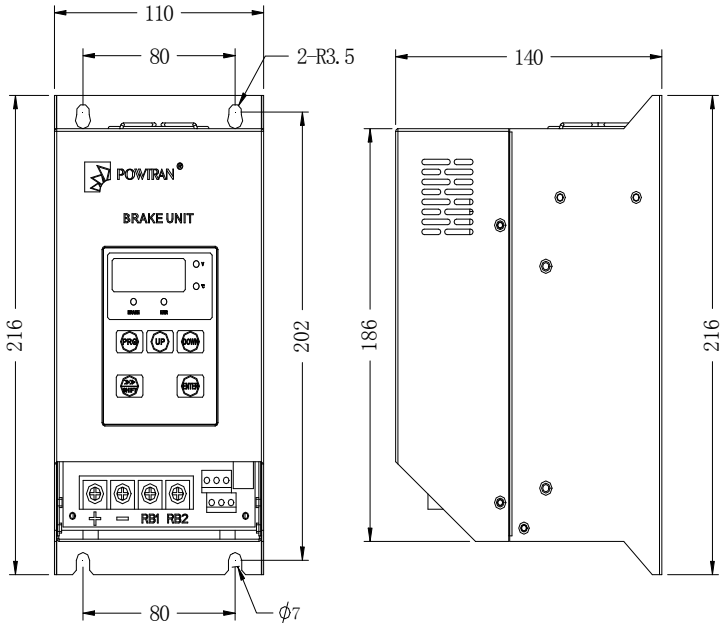


Figure 2-3:40-100A Braking unit installation dimension

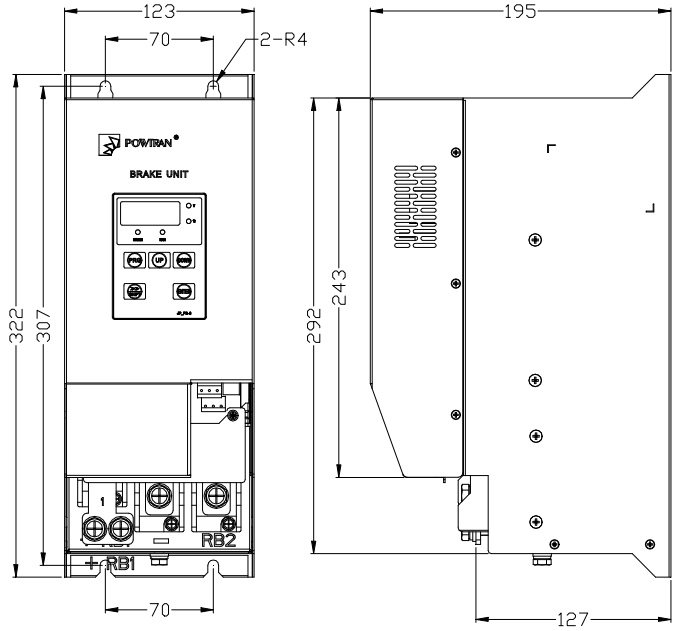


Figure 2-4:180-250A Braking unit installation dimension

2-5.Wiring diagram

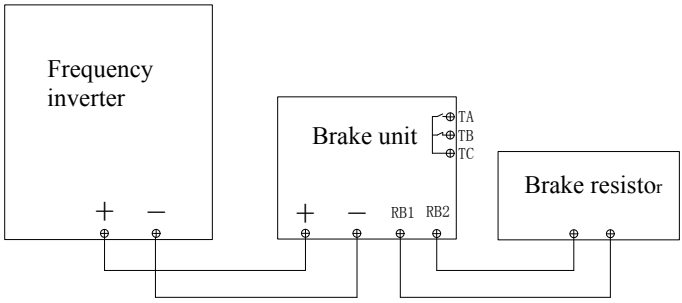


Figure 2-5:Single brake unit wiring diagram

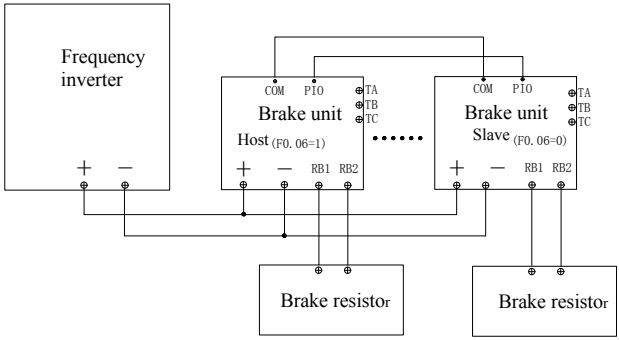


Figure 2-6:Figure multi-brake units parallel connection diagram

NOTE:

1. The connection cable of frequency inverter and brake unit shall be twisted with two lines, the longest of which shall not exceed 5m
2. The distance of the connection between the brake resistor and brake unit should less than 10m, should use heat-resistant wires.
3. +/P+ is the positive end of DC BUS in the frequency inverter, -P- is the negative end.
4. Output relay TA/TB/TC,TA-TC normally open and TB-TC close. Relay drive ability. :normally close 3A/AC 250V,normally open.5A/AC 250V.
5. Wrong connection of main circuit will cause damage of brake unit and frequency inverter.
6. Please do not touch the brake unit when it is working, to avoid scald.

2-5-1. Brake unit main circuit terminal and making circuit terminal

1、Main circuit terminal

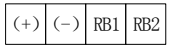


Figure 2-5. Brake unit main circuit terminal

Terminal mark	Function instruction
(+)	Connect the positive terminal of the inverter DC BUS.
(-)	Connect the negative terminal of the inverter DC BUS.
RB1、RB2	External connect brake resistor terminal
PE	Brake unit ground terminal

2. Control circuit terminal

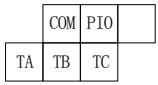


Figure 2-6. Control circuit terminal

Terminal mark	Function instruction
COM	Brake unit control circuit ground.
PIO	Brake units work in parallel in input or output terminal, when multi brake unit used in parallel, send control signal through the terminal that braking unit can run simultaneously.
TA/TB/TC	Fault output terminals, when braking unit failure, send out fault alarm signal. TA - TC for normally open and TB - TC closed

3-1.Operate keyboard instruction

Figure 3-1:Operate keyboard display

3-2.Keyboard indicators instruction

Indicator mark		Name
Status light	V	Brake unit input voltage
	℃	On :IGBT temperature
	BRAKE	On :Brake unit on brake status . Dull : Brake unit on standby status
	ERR	Off :Fault indicator light

3-3.Operation panel button instruction

Mark	Name	Function
	Parameter setting / ESC key	* Enter the first level menu parameters changes state. * Exit function data modify. * Exit from submenu or function item menu to status display menu
	Shift key	* Under the standby display interface and brake display interface, display parameters can be selected circularly. When modify a parameter, customer can select the modification bit of the parameter
	Increasing key	*Date and function increasing key.

DOWN	Descending key	* Date and function descending key.
ENTER	Confirm key	*Step by step into the menu screen, set parameter confirmation.

3-4.Keyboard display alphabet and number correspondence table

	Display Alphabet	Correspondence Alphabet	Display Alphabet	Correspondence Alphabet	Display Alphabet	Correspondence Alphabet
Digital display area	0	0	1	1	2	2
	3	3	4	4	5	5
	6	6	7	7	8	8
	9	9	d	d	E	E
	F	F	r	r	y	y
	.	.	-	-		

3-5.Examples of parameter setting

3-5-1.Description of Function code viewing and modifying method

PB200 operation panel adopts three-level menu structure to set parameters and other operations. The three-level menus are: function parameter group (first-level menu) function code (second-level menu) function code setting value (third-level menu). The operation flow is shown in the figure.

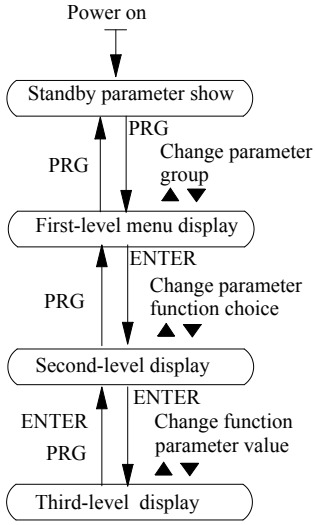


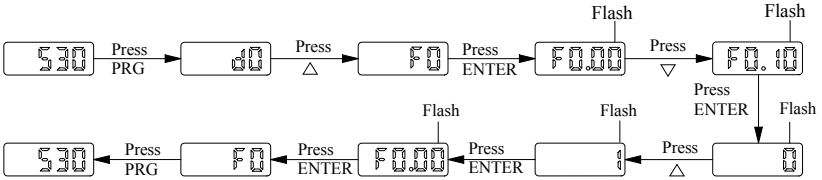
Figure 3-2: Operational flow chart

Description: In the operation of three-level menu, you can press PRG or ENTER to return to the second-level menu. The difference between the two is: Press ENTER key to save the set parameters and return to the secondary menu, and automatically transfer to the next function code;

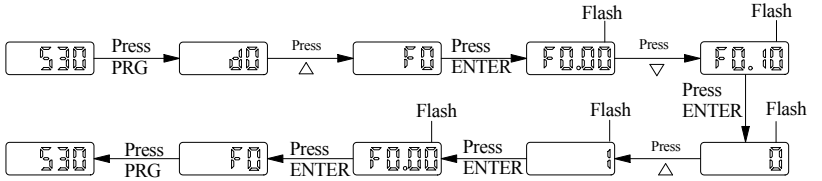
Pressing the PRG key directly returns to the secondary menu, without storing parameters, and returns to the current function code.

Example 1: The starting voltage of braking is modified to 380V, assuming that the input voltage of the braking unit is 530VDC.

Change F0.00 from 670V to 660V



Example 2. Restore factory parameters



In the third menu state, if the parameter has no flicker bits, it means that the function code can not be modified. The possible reasons are as follows:

1) The function code is an unmodifiable parameter. For example, the actual detection parameters, operation record parameters and so on.

2) The function code can not be modified in the running state, and can not be modified until the downtime.

3-5-2.Viewing method of state parameters

During shutdown or operation, the temperature and brake unit input voltage can be separated by the shift key. 

4-1. Menu group

Attention:

"★": In the braking state, the setting value of this parameter can not be changed;

"●": The actual detection value can not be changed;

"☆": It can be changed when it is in downtime or running state.

Group d is the monitoring function parameter, Group F is the basic function parameter, Group Y1 is the fault history query.

4-1-1.d0 Monitoring function group

Parameter Code	Parameter name	Parameter name
d0.00	Braking unit input voltage / Inverter bus voltage	V
Braking unit input voltage		
d0.01	Module temperature	℃
Detection value of radiator temperature of inverter module		
d0.02	Software version	-
Display current brake unit software version number		

4-1-2.Basic functional group

Code	Parameter name	Setting range	Factory setting	Change
F0.00	Braking start voltage	300V～2500V	Model confirmed	☆
This parameter is used to set the starting braking voltage of the braking unit. 220V voltage level, default braking voltage is 350V; 380V voltage level, default braking voltage is 670V; 480V voltage level, default braking voltage is 760V;				
F0.01	Braking hysteresis voltage	0V～100V	20V	☆
This parameter is used to set the hysteresis voltage during braking. Generally when setting braking start voltage and braking stop voltage, there must be a hysteresis loop. Such as settings F0.00=670V,F0.01=20V,when the bus voltage d0.00 is higher than F0.00, start braking. When the bus voltage d0.00 is lower than (F0.00-F0.01), stop braking. When the original state is in braking state, and the value of d0.00 is within F0.00 ~ (F0.00-F0.01), the braking state is maintained.				
F0.02	Default brake voltage selection	0～2	1	★
This parameter is used to set the default braking voltage for different voltage levels. When setting to 0, corresponding to 220V voltage level, the default braking voltage is 350V; When setting to 1, corresponding to 380V voltage level, the default braking voltage is 670V; When setting to 2, corresponding to 480V voltage level, the default braking voltage is 760V;				
F0.03	Braking rate	0%～100%	100%	☆
This parameter is used to select the braking rate. When braking rate is set to 100%, it shows that the braking is fully open, at this time the braking effect is the best, with the fastest voltage drop, but the brake resistor temperature rises quickly. When the braking rate is set to 0%, it shows that the braking is turned off, at this time even if it reaches the braking condition, the braking does not work.				

F0.04	Voltage modulation factor	0%～200%	100%	☆
This parameter can be used to adjust the d0.00 bus voltage detection value. That is d0.00＝DC BUS input voltage =d0.00*F0.04.				
F0.05	Relay output function selection	0～4	0	☆

Relay function instructions below:

Setting value	Function	Description
0	No output	The relay outputs no action.
1	In Braking	In braking state, the relay outputs ON signal.
2	Braking feedback fault (IGBT short circuit)	In braking process, it feedback IGBT short-circuit fault, the relay output ON signal.
3	Over-temperature alarm	When the module temperature exceeds 85℃, the over-temperature alarm signal is generated, the relay outputs ON signal.
4	Fault output	When brake feedback fault or over-temperature fault occurs, the relay output ON signal.

F0.06	Master and slave selection	Slave	0	1	★
		aster	1		
This parameter is used for the parallel function, setting the braking unit as master or slave. If you do not use the parallel function, the system single-set default unit host.					
F0.07	Temperature hysteresis value	0～50		3	☆
This parameter is used to set the hysteresis value of the temperature. The default temperature alarm value for the brake unit is 85 ℃. If the temperature hysteresis value is set to 3 ℃, when there is not over temperature fault, if only the temperature exceeds 85 ℃, it alrms. If over temperature fault occurs, the alarm is canceled only when the temperature drops below 82 ℃.					
F0.08	Total power-on time	0~50000h		-	●
Display the total power-on time of braking unit since it is out of factory.					
F0.09	Total running time	0~50000h		-	●
F0.10	Parameter initialization	No operation	0	0	★
		The parameters restored to factory value	1		
		Clear record information	2		

1: Restore to the factory setting (F0.10 = 1), most of the brake unit parameters are restored to factory setting, except default braking voltage level (F0.02), fault record information, total power-on time, total running time.

2: Clear the record information (F0.10 = 2) Clear the fault record information, total power-on time, total running time of the braking unit.

4-1-3. Fault query

Code	Parameter name	Setting range	Factory setting	Change
y1.00	Type of the first fault	0～2	-	●
y1.01	Type of the second fault	0～2	-	●
y1.02	Type of the third(at last) fault	0～2	-	●
Record the type of the last three faults of PB200, 0 for no fault. Please refer to the related				

instructions for the possible causes and solutions for each fault code.

Failure type table:

No.	Failure type
0	No fault
1	Braking feedback fault (IGBT short circuit)
2	Over temperature fault

y1.03	Bus voltage of the third fault	Bus voltage of the last fault	●
y1.04	Temperature of the third fault	Temperature of the last fault	●
y1.05	Braking rate of the third fault	Braking rate of the last fault	●
y1.06	Power on time of the third fault	Power on time of the last fault	●
y1.07	Running time of the third fault	Running time of the last fault	●
y1.08	Bus voltage of the second fault	Bus voltage of the previous fault	●
y1.09	Temperature of the second fault	Temperature of the previous fault	●
y1.10	Braking rate of the second fault	Braking rate of the previous fault	●
y1.11	Power on time of the second fault	Power on time of the previous fault	●
y1.12	Running time of the second fault	Running time of the previous fault	●
y1.13	Bus voltage of the first fault	Bus voltage before the previous fault	●
y1.14	Temperature of the first fault	Temperature before the previous fault	●
y1.15	Braking rate of the first fault	Braking rate before the previous fault	●
y1.16	Power on time of the first fault	Power on time before the previous fault	●
y1.17	Running time of the first fault	Running time before the previous fault	●

5-1 Brake unit

5-1-1.Brake voltage selection is based on below two conditions:

(1) According to the input voltage level of inverter , choose the brake unit with relative voltage level

(2) According to the required braking power when inverter is braking , choose the brake unit with relative power .

The principle of brake unit power selection is that the power of brake unit is greater than the braking power . in the case where the braking power is not specified , please estimate according to below ways :

Pb=P*Td*K

In this formula:Pb-----braking power;

P----- motor power

K----- mechanical energy conversion efficiency,the general value is 0.7

Td---- ratio of brake torque to motor rated torque

Td values vary in different systems , as shown in the following table.

Common applications	Elevator lift crane	Uncoiler and recoiling	Large inertia equipment that requires quick stopping	Ordinary inertial load
Td value	100%	120%	120%	80%

5-1-2.Brake resistor resistance selection

When it is braking, the regenerative energy of the motor is almost consumed on the brake resistor ,according to the formula:

U*U/R=Pb

In the formula:U----- braking voltage in stable braking system

(vary in different systems , for 220VAC system usually choose 380v; for 380VAC system usually choose 700V, for 480VAC system usually choose 800V)

Note: when the value of R is less than the minimum resistance of each voltage level, multiple brake units are required.

5-1-3.Brake unit power selection

In theory , the power of brake resistance is same as the braking power , but considering derating is 70%. according to formula:

0.7*Pr=Pb*ED

In the formula:Pr-----brake unit power

ED----- braking frequency , the proportion of braking process in the whole working process

Common application	ED value
Uncoiler and recoiling	20%～30%
Accidental braking load	5%
Elevator	20%～30%
Lifting machinery , centrifuge	50%～60%
Injection molding machine	5%～10%
General occasion	10%

In the above table, the recommended braking unit and braking resistor resistance can meet various inverters with ED=0～100%. And the power of the braking resistor depends on the application conditions.

5-1-4.Inverter input voltage level specification and selection reference

1. This table is the selection reference of 220V inverter, according to the brake unit DC operating point 350V, braking frequency ED = 10%, and braking torque 100%.

Inverter power (kW)	Brake unit		Brake resistor (100% brake torque)	
	Specification	Quantity (pcs)	Specification	Quantity (pcs)
15	PB200-040-2	1	≥9Ω/2kW	1
18.5	PB200-040-2	1	≥9Ω/2kW	1
22	PB200-050-2	1	≥7Ω/3kW	1
30	PB200-075-2	1	≥5Ω/3kW	1
37	PB200-075-2	1	≥5Ω/4kW	1
45	PB200-100-2	1	≥4Ω/5kW	1
55	PB200-100-2	1	≥4Ω/6kW	1
75	PB200-180-2	1	≥2Ω/8kW	1
93	PB200-180-2	1	≥2Ω/10kW	1
110	PB200-180-2	2	≥2Ω/7kW	2
132	PB200-180-2	2	≥2Ω/8kW	2
160	PB200-100-2	2	≥2Ω/9kW	2

2.This table is the selection reference of 380V inverter, according to the brake unit DC operating point 670V, braking frequency ED = 10%, and braking torque 100%.

Inverter power (kW)	Brake unit		Brake resistor (100% brake torque)	
	Specification	Quantity (pcs)	Specification	Quantity (pcs)
18.5	PB200-040-3	1	≥17Ω/2kW	1
22	PB200-040-3	1	≥17Ω/3kW	1
30	PB200-040-3	1	≥17Ω/3kW	1
37	PB200-040-3	1	≥17Ω/4kW	1
45	PB200-050-3	1	≥14Ω/5kW	1
55	PB200-075-3	1	≥9Ω/6kW	1
75	PB200-100-3	1	≥7Ω/8kW	1
93	PB200-100-3	1	≥7Ω/10kW	1
110	PB200-180-3	1	≥4Ω/12kW	1
132	PB200-180-3	1	≥4Ω/15kW	1
160	PB200-180-3	1	≥4Ω/18kW	1
187	PB200-100-3	2	≥7Ω/10kW	2
200	PB200-100-3	2	≥7Ω/11kW	2
220	PB200-180-3	2	≥4Ω/12kW	2
250	PB200-180-3	2	≥4Ω/13kW	2
280	PB200-180-3	2	≥4Ω/15kW	2
315	PB200-180-3	2	≥4Ω/17kW	2
355	PB200-180-3	3	≥4Ω/13kW	3
400	PB200-180-3	3	≥4Ω/14kW	3

3.This table is the selection reference of 480V inverter, according to the brake unit DC operating point 760V, braking frequency ED = 10%, and braking torque 100%.

Inverter power (kW)	Brake unit		Brake resistor (100% brake torque)	
	Specification	Quantity (pcs)	Specification	Quantity (pcs)
18.5	PB200-040-4	1	≥19Ω/2kW	1
22	PB200-040-4	1	≥19Ω/3kW	1
30	PB200-040-4	1	≥19Ω/3kW	1
37	PB200-040-4	1	≥19Ω/4kW	1
45	PB200-050-4	1	≥16Ω/5kW	1
55	PB200-075-4	1	≥11Ω/6kW	1
75	PB200-075-4	1	≥11Ω/8kW	1
93	PB200-100-4	1	≥8Ω/10kW	1
110	PB200-100-4	1	≥8Ω/12kW	1
132	PB200-180-4	1	≥5Ω/14kW	1
160	PB200-180-4	1	≥5Ω/18kW	1
187	PB200-180-4	1	≥5Ω/20kW	1
200	PB200-180-4	1	≥5Ω/22kW	1
220	PB200-100-4	2	≥8Ω/12kW	2
250	PB200-180-4	2	≥5Ω/14kW	2
280	PB200-180-4	2	≥5Ω/15kW	2
315	PB200-180-4	2	≥5Ω/17kW	2
355	PB200-180-4	2	≥5Ω/19kW	2
400	PB200-180-4	2	≥5Ω/21kW	2

Chapter 6 Abnormal diagnosis and treatment

PB200 braking unit has 2 types of protection, once the fault occurs, the protection function act, braking unit stops working, and display the fault type on the display panel. Users can follow the tips in this section to check firstly, analysis the reason of fault, and find a solution.
If fault occurs during debugging, refer to the troubleshooting and protection functions list in Table 6-1 to confirm fault type and troubleshooting method. If you can not find the troubleshooting method during the debugging process, please contact POWTRAN technical service personnel.
Table 6-1 List of braking unit fault diagnosis and protection functions:

No.	Error code	Error type	Possible causes	Solutions
1	E.SHo	Braking feedback fault (IGBT short circuit)	1.Braking unit output circuit short-circuit 2.Brake unit internal wiring loose. 3.Drive circuit is abnormal 4.Inverter module is abnormal	1.Exclude peripheral faults 2. Plug all the cables well 3. Seek technical support 4. Seek technical support
2	E.oH	Module is overheating	1.Air duct get blockage 2.Fan damaged 3.Ambient temperature is too high 4.Module thermistor Is damaged 5.Inverter module is damage	1.Clean the air duct 2.Replace the fan 3.Reduce ambient temperature 4.Replace thermistor 5.Replace the inverter module

7-1.Inspection and maintenance

During normal use of the brake unit, in addition to routine inspections, the regular inspections are required, please refer to the following table to implement the preventive measures.

Check Date		Check Points	Check Items	Check to be done	Method	Criterion
Routine	Regular					
√		Display	LED display	Whether display is abnormal or not	Visually check	As per use status
√	√	Cooling system	Fan	Whether abnormal noise or vibration exists or not	Visually and audibly check	No abnormal
√		Body	Surrounding conditions	Temperature, humidity, dust, harmful gas.	Visually check with smelling and feeling	As per Section 2-1
√		Input/ output terminals	Voltage	Whether input/output voltage is abnormal or not	Test R, S, T and U, V, W terminals	As per standard specifications
	√	Main circuit	Overall	Whether these phenomenon of loose fastenings, overheat, discharging, much dust, or blocked air duct exist or not	Visually check, tighten and clean	No abnormal
			Electrolytic capacitance	Whether appearance is abnormal or not	Visually check	No abnormal
			Wires and conducting bar	Whether they are loose or not	Visually check	No abnormal
			Terminals	If screws or bolts are loose or not	Tighten	No abnormal

"√" means routine or regular check to be needed

Do not disassemble or shake the device gratuitously during check, and never unplug the connectors, otherwise the system will not run or will enter into fault state and lead to component failure or even damage to the main switching device such as IGBT module.

7-2.Parts for regular replacement

To ensure the reliable operation of inverter, in addition to regular care and maintenance, some internal mechanical wear parts(including cooling fan, filtering capacitor of main circuit for energy storage and exchange, and printed circuit board) shall be regularly replaced. Use and replacement for such parts shall follow the provisions of below table, also depend on the specific application environment, load and current status of inverter.

Name of Parts	Standard life time
Cooling fan	1 to 3 years
Printed circuit board(PCB)	5 to 8 years

7-3.Storage

The following actions must be taken if the inverter is not put into use immediately(temporary or long-term storage) after purchasing:

(1)It should be store at a well-ventilated site without damp, dust or metal dust, and the ambient temperature complies with the range stipulated by standard specification

(2)Voltage withstand test can not be arbitrarily implemented, it will reduce the life of inverter.

Long- term storage will lead to capacitor degradation, it should be energized once within 2 years and the power- on time must be at least 5 hours. The input voltage must be slowly increased to the rated voltage value with the adjustable power supply.

Chapter 8 Quality assurance

The product quality shall comply with the following provisions:

1. Warranty terms

1-1. The product from the user the date of purchase, the warranty period of 18 months (limited to domestic market).

1-2. Export products Within the normal quality range, if the product has quality problems, 18 months warranty, within three months replacement.

1-3. The product from the user the purchase date, enjoy lifelong compensable service.

2. Exceptions clause

If belongs to the quality problems caused by following reasons products, not within the warranty.

2-1. The user is not in accordance with the "products manual" is used method of operation caused the failure.

2-2. Users without permission to repair or alteration caused by product failure.

2-3. Users beyond the standard specifications require the use of the brake unit caused by product failure.

2-4. Users to buy and then fell loss or damage caused by improper handling.

2-5. Because the user use environment device caused by aging lead to product failure.

2-6. Due to the fault cause of earthquake, fire, lightning, wind or water disaster, abnormal voltage irresistible natural disasters.

2-7. Damaged during shipping (Note: the transport mode specified by the customer, the company to assist to handle cargo transfer procedures).

3. The following conditions, manufacturers have the right not to be warranty

3-1. No product nameplate or product nameplate blurred beyond recognition.

3-2. Not according to the purchase contract agreement to pay the money.

3-3. For installation, wiring, operation, maintenance and other users can not describe the objective reality to the company's technical service center.

4. In return, replacement, repair service, shall be returned the company, confirmed the attribution of responsibility, can be returned or repair

5. About the repair fee, according to our company latest price list as a standard.

6. When the products is broken, please complete the form and warranty card, shipping with the failure machine to our company.

7. Dalian Powtran Technology Co.,Ltd reserve the right to explain the terms of the event.

Modified record

Serial No.	Modified date	Modified content record	Modified version
1			
2			
3			

Product information feedback

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